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As the newly retired editor of the Bulletin, I am happy to hand on the reins to James Bradley and wish him the very best for his term in that position. Jim received his Ph.D. from Syracuse University in 1979, served on the staff of the Massachusetts Historical Commission from 1979 to 1990, and was director of the Robert S. Peabody Museum of Archaeology in Andover from 1990 to 2001. He is currently the president of ArchLink, a small consulting company dedicated to linking archaeology with education and preservation.

I particularly want to thank Kathy Fairbanks and Bill Moody for their sterling work as proof-readers, as well as Ron Dalton, President of the Massachusetts Archaeological Society, and the Board of Trustees for their support and encouragement. For my part, I shall be working once more with the collections at the Concord Museum where I am a curator as well as enjoying my first grandchild.

Shirley Blancke

It is a great honor for me to assume the editorship of the Bulletin of the Massachusetts Archaeological Society. It is also a humbling experience. One follows in the footsteps of great predecessors: Shirley Blancke, Betty Little, Barb Luedtke and Dena Dincauze to name a few. The Bulletin itself has a pretty impressive history. For more than sixty years, it has served as one of the mainstays for archaeological publishing in the Northeast. It has been a journal that welcomed new authors as well as regular contributors, and encouraged submissions from both avocationalists and professionals.

This issue continues these traditions of diversity and excellence. Tim Ives reports on his experiences with making and using atlatls. Gene Winter describes a cache of Greene points from the Pringle site in Tewksbury and some of the questions these raise. Alan Leveillee and Joseph Waller provide a wonderful example of how to involve the public in archaeology while Peter Pagoulatos presents the results of an avocational-based site registration program in New Jersey. Finally, Jeff Carovillano describes a Contact Period component at the Den Rock site in North Andover and explores some of its implications for understanding Native/European relations during the 17th century.

I look forward to working with the officers and membership of the MAS to keep the Bulletin at the forefront of archaeological publishing in New England. If you have an article to submit, or even an idea for an article you wish to discuss, please feel free to contact me. It is member interest and contributions that will keep the Bulletin strong. Thank you for your support.

James W. Bradley
Rediscovering the Atlatl: Observations on the Dynamics of Atlatl Design and Operation Based on Experimentation

Timothy H. Ives

Abstract

This paper presents the author’s observations on the dynamics of atlatl design and operation based on experimentation carried out in the past two years. This experimentation has been geared toward the refinement of the author’s atlatl equipment for use in precision throwing. Through trial and error in the construction of this equipment, and observation of fellow atlatlists, the author has identified certain design elements that affect performance. This information is presented in light of contemporary atlatl technologies used by native peoples, contemporary atlatl technology used by competitors, and scholarly theory.

Introduction

Most archaeologists have a basic idea of what an atlatl is and what it does. It’s a stick-like instrument (with a spur, or hook, on the end) that is used as an extension of the arm to propel darts. The atlatl provides substantially more thrust than hand throwing because it remains in contact with the dart for a longer period of time. It also provides the thrower with superior grip and control of the dart, which, in turn, increases accuracy (Howard 1974). Ethnographic data indicates that in hunting, the effective distance of projectiles launched with an atlatl is limited to a maximum of 45 meters, but, in general, a precise shot does not exceed 20 to 30 meters (Cattelain 1997). The atlatl appears to represent a stage in the evolution of hunting technology, preceding the bow and arrow (Knecht 1997). There was a time when most people living in New England had an intimate knowledge of the atlatl. However, it has been a device far removed from my experience, and from our collective experience as twentieth century New Englanders. Our familiarity with the atlatl is drawn primarily from ethnographic accounts from other regions of the world, and information gained through the archaeological record. This record has confirmed its use in New England during the Middle Archaic Period (Doucette 1997), but offers limited information, as ancient hunting technologies are largely non-durable.

This article outlines an approach to understanding the atlatl through a deliberate process of rediscovery. This author has been experimenting with atlatls and darts for the past two years, and is among thousands of people in the United States and Europe who are partaking in an atlatl "renaissance" (Kleiner 1999). A modern day atlatl culture can be accessed by simply typing the word "atlatl" into an internet search engine. I have attended three competitions in the past two years (held in Vermont and New York) and witnessed some remarkably skilled atlatlists. Competitions focus mainly on contests of accuracy. Some competitors are so accurate they can consistently hit a one foot circle from a distance of sixty feet, all day long. These people are not archaeologists. However, their knowledge of the atlatl is intimate, and it extends beyond what can be gained through written sources.
Although I am not as skilled as most veteran throwers, I joined them as a fellow enthusiast and competitor.

Through experimentation, and observation, I have identified some key dynamics of atlatl manufacture and operation. As introduction to those dynamics, a brief overview of atlatl technologies that persisted into the twentieth century in native contexts is provided.

**Atlatls in Recent Native Contexts**

From the perspective of an archaeologist studying prehistory in New England, the atlatl may be considered a weapon from the ancient past, which had been abandoned for bow and arrow technology long before the arrival of European colonists. However, from a global perspective, the atlatl must be viewed as a contemporary hunting technology for some indigenous peoples.

In some areas of western Mexico, Indian fishermen currently employ the atlatl in conjunction with a harpoon-like spear (Perkins 2002). Waterfowl hunting also persisted into the twentieth century (Sterling 1960). In 1944, archaeologists Richard Stewart and M.W. Sterling visited Lake Patzcuaro. There they were invited to join in a coot hunting trip on the lake by a small group of Indians from a local village. The waterfowl hunting technique reported by Stewart and Sterling is similar to that used in the arctic. A boat approaches a sitting flock of birds until the birds take flight, then a dart with multiple prongs is launched into their midst. The dart shaft, which appears to be flexible, is 9 feet long and constructed from a giant reed (*Arundo donax*) originally introduced from Asia Minor, which is now widespread throughout the Western Hemisphere. The atlatl, which appears to be rigid, is usually carved by a local craftsman and offered for sale along with darts at a price equivalent to the cost of a couple of ducks. The bottom or underside of the distal end has a hook-like projection that is used to help retrieve the dart or duck from the water. This hook is sometimes carved to look like a duck bill.

The atlatl is still in use by native Brazilian groups (the Karaya and Wauru) in limited capacities. I do not have sufficient information to characterize their atlatl technologies or usages.

Atlatl use by aboriginal Australians continues to this day (Perkins 2002), and their atlatls are known to exhibit highly variable forms (Davidson 1936). Aboriginal Australians appear to have two predominant types of atlatls, which they call woomeras (Fogleman 1997). The first type has a narrow, flat blade, and may be flexible. The second type, which is a rigid thrower, is scooped and wide. An account from Groote Eyelandt explains that the narrow-bladed woomera is reserved for fishing and warfare while the wide-bladed woomera is used for hunting (Levitt 1981). The wide-bladed hunting woomera causes little noise during the throwing motion. The wallaby’s (a common quarry) acute hearing can register the faint hiss of the narrow-bladed woomera in time to bound away before the dart reaches it. This account indicates that the paddle-like form of the hunting woomera is functional.

New Guinea atlatls are rigid throwers constructed from bamboo cane and often have a wooden carved animal or bird effigy on the shaft (Fogleman 1997). In some cases, these
carvings act as dart rests, which make holding the dart easier prior to throwing. New Guinea dart shafts appear to be flexible and made from bamboo cane.

Across the Arctic, atlatls are generally referred to as throwing boards. They have been in use during historic times from the Bering Strait to Southeast Alaska to Greenland. Throwing boards are rigid in form, and styles vary considerably. Stylistic variations depend on their intended use, on other factors such as local tradition or the available types of raw material, or on a combination of these factors (Cattelain 1997). Many examples were collected for the National Museum in the late nineteenth century (Mason 1885). Various design elements can be present in the handle area, including finger holes and/or ivory pegs. Throwing boards are used exclusively from a seated position in kayaks in a marine environment (Cattelain 1997). Over the past fifty years, the rifle has replaced the atlatl as one of the primary hunting tools of the Arctic (Perkins 2002).

The place of the atlatl in native contexts is uncertain as we move into the twenty-first century. The utility of this weapon may become entirely eclipsed by the availability of firearms for hunting, and/or alternate strategies of food procurement within an increasingly global economy. Despite an uncertain future in native contexts, it seems likely that atlatl use will be perpetuated in the contexts of hobby and sport.

**Hands-on Experimentation with Atlatls and Darts**

Through trial and error in the construction of atlatl equipment, and observation of fellow atlatlists, I have identified certain design elements which appear to be more favorable than others, relative to performance. Please keep in mind that what I have learned is in the context of target shooting. I have never hunted with an atlatl and cannot lend a hunter's perspective. As to my equipment and the materials used in its construction, I use a flexible atlatl fashioned from Osage Orange, a strong, but highly flexible wood often used for bows. See Figure 1. My atlatl looks much like a bow that has been cut in half. Its total length is 56 cm. The shaft section that experiences significant flex measures approximately 30 cm in length, and is shaved down to a thinness of approximately 0.45 cm. The spur is fashioned from white tailed deer antler. A soapstone weight (weighing 64.1 grams) is lashed to the shaft a few centimeters above the handle, using hemp cordage. The complete atlatl, with weight attached, weighs 179.9 grams. My darts are made from bamboo cane shafts that has been filed smooth to a thin diameter, rendering them lightweight and somewhat flexible. The dart's foreshaft, or front section, is a carefully joined piece of oak or white tailed deer antler which absorbs impacts well. Each dart is slightly forward-balanced, and is fletched with turkey feathers to insure straight flight. A combination of hemp cordage and synthetic glue binds the fletching to the dart shaft. My average dart weighs approximately 110.0 grams.

**Dart Design and Performance**

Atlatl expert Bob Perkins has stated that "A finely tuned dart will work reasonably well with any thrower, but the reverse is not true,
i.e., the best of throwers will not make a poor dart work well" (Perkins 1996, in Fogleman 1997). This is indeed an accurate piece of insight. The foremost item of importance in making one's atlatl equipment is the dart. There are several variables to keep in mind when constructing a dart.

Straightness is a highly desirable quality in a dart. Therefore, shaft-straightening is a key skill in dart manufacture and maintenance. I am aware of two straightening methods. The first involves heat, and can be used on both wood and cane shafts. The shaft is heated near a flame until it reaches a threshold when it turns "rubbery." At that point, the shaft is bent into the desired position and held for a minute or two until it cools and sets in that position. The second method involves mechanical compression and is only effective on wood shafts. This technique is a variation on "boning," which is a dry method of finishing wood through surface compression. One simply bends the shaft in the opposite direction of the unwanted curve, while rubbing down on it very hard with a smooth object, such as a glass bottle. Shaft straightening hooks can also be used, but a bottle works sufficiently well.

Darts that have a balance point slightly forward of the center line are easier to aim than center-balanced darts. Darts made of cane are naturally weighted in this manner, regardless of projectile point attachment. Cane grows thicker at the base, and thinner at the top, so when a shaft is cut from cane, the thicker, heavier, end always serves as the forward portion. It has been noted that many Inuit and Australian darts are designed to have a progressive widening of the shaft from the base toward the point (Cattelain 1997). Some experimentation indicates that unfletched darts need to have a center of gravity that is shifted forward, situated at around 60% of the length (calculated from the base), in order to have a straight flight. However, I have noted that some competitors use fletched darts made from wooden dowels of uniform diameter, which are
center-balanced. Some of these competitors are exceptionally accurate throwers, therefore, dart balancing is not a critical factor for every atlatlist. On the other hand, some competitors meticulously weight and balance their darts so they forward-balance at a desired location, which suggests that there is an advantage to forward-balancing. I suspect that the competitors who use darts made from dowels do so out of convenience. Longer darts are easier to aim than short darts. When competing in an accuracy competition, long darts are the best choice. The darts I use for accuracy competition, are approximately 6.5 feet long. For distance throwing, light short darts are the best choice (Fogleman 1997).

In order for a dart to be cast consistently and without complication, the dart-nock and atlatl-spur connection must be properly designed. Nocks that are too deep will either snap off the spur, or cause the end of the dart to rip open during casting. Sharp spurs, if placed at too acute an angle relative to the atlatl shaft, can hook the end of the dart downwards during casting, causing it to miss the target and/or wobble during flight. I have found that the best nock is shallow, and cup-like in form. Such a nock will accommodate almost any spur design or angle without hooking the end of the dart during casting.

Having one's darts well matched will help produce predictable results when throwing. After finding a design that works well, it is advantageous to standardize all subsequent darts accordingly (Fogleman 2000, personal communication). At competitions, I have noticed that other competitor's dart sets are very homogeneous in character. This aspect of dart making is of particular interest because it may not be accessible in the archaeological record. Most parts of projectile technologies are non-durable (Knecht 1997), so encountering darts, much less whole sets, in this record is of low probability. When standardizing darts, the following factors may require attention: straightness, length, weight, balance point, pounds of force required to flex the dart, and distribution of flex along the shaft (Fogleman 2000, personal communication).

Atlatl Design and Performance

Among modern competitors, atlatl design characteristics appear to be a matter of personal preference, as they vary considerably. There is not necessarily a best atlatl design, but some design elements seem advantageous. Some design characteristics vary from one competitor to the next. Determining the ideal length of one's atlatl hinges on many variables, including arm length, arm strength, length and weight of the dart, and whether or not the atlatl/and or dart will be flexible. Atlatl length must be worked out by the individual. The type of grip one chooses is also matter of personal preference. The hammer style grip seems to work for everyone, although some prefer to have a finger and thumb strap attached to aid in gripping.

A moderate amount of flexibility in the atlatl shaft appears to be an advantageous design characteristic, enhancing one's throwing accuracy. I have made four rigid, or non-flexible, atlatls, and have found them more difficult to handle than flexible ones. My newest, flexible, atlatl responds with a substantially more "smooth" and "controlled" feel when casting. This flexibility allows for a
much easier follow through. This effect has been described quite well by Ray Strischek, the World Atlatl Association International Standard Accuracy Competition champion in 1997:

"Out of curiosity, I made a flexible atlatl, and noticed that the moment of the most flex in the atlatl shaft also happened at the moment when the atlatl shaft was vertical. In my opinion, the flexing of the atlatl acts as a shock absorber. Certainly the strain on my wrist was reduced and I no longer felt that hesitation when the atlatl shaft was vertical. I was just able to just plow on through the casting motion." (R. Strischek 1991, in Palter 1998)

I can also throw darts at a slightly higher velocity with the flexible atlatl. One study, based on computer modeling, has quantified the increase in projectile velocity or kinetic energy caused by allowing the atlatl to flex (Baugh 1998). The increase in velocity is measurable, but not dramatic.

The topic of atlatl weights is controversial among many archaeologists. One thing we can infer about the function of atlatl weights is that they did not contribute to an increase in the speed or overall distance of the dart. The addition of a weight to the atlatl's mass would detract from the amount of force imparted to the dart during casting (Howard 1974).

I believe the addition of a weight to a flexible atlatl further augments the amount of control one has during casting. Its effects on the system are twofold. First, it acts as a counter balance (Peets 1960), making aiming easier. When holding an atlatl and dart, it is clear that the system is front-heavy. Muscles in the hand and arm must be used to stabilize the dart (keep it from drooping downwards) before casting. The system becomes even more front-heavy when a flexible, and thus very lightweight, atlatl is being used. By attaching a weight to the shaft of the atlatl, it acts as a counter balance, reducing the amount of energy one must use to keep it stabilized prior to casting. The weight need not provide a complete counter balance for the dart. As long as it minimizes the out-of-balance effect to some degree, a benefit can be noticed. Second, a weight acts as a stabilizer, which provides greater control during casting (Butler 1975). It adds inertia to the throwing system, which in turn, dampens the side to side oscillations generated by hand tremors or heartbeats. I also believe that the atlatl weight's functions as a stabilizer and counter balance go hand in hand, as suggested by Butler (1975).

There is a third function that an atlatl weight can provide, if employed properly. It can act as a timing device increasing the efficiency of energy transferal to the dart. This is explained by Perkins:

"Its mass [atlatl weight], located approximately at the middle of the atlatl shaft, resists acceleration, (Newton's First Law of Motion) and forces that atlatl to deflect further than is possible without it. This enables that atlatl to store more spring energy to be used to push the dart away from the atlatl. The weight's position along the atlatl shaft influences that amount and rate at which energy is stored and released. Therefore, the atlatl weight is a timing device influencing the amount and rate at which the spring energy of an atlatl is stored and
released against the spring energy of the dart.” (Perkins 1993)

I am unaware of any controlled studies which substantiate this claim. However, it is common knowledge among competitors that every flexible atlatl has a "sweet spot." If one has a flexible atlatl, a "tuning stone" (a pebble, or "no frills" atlatl weight) may improve throwing performance. To achieve this, one attaches the stone to the flexible portion of the atlatl shaft and throws darts several times, moving the stone about the atlatl shaft until the sweet spot is found. When the dart feels as if it "springs" from the atlatl during casting, the sweet spot has been found. This effect suggests that the tuning stone stores and releases momentum during casting. Perhaps such placement minimizes kinetic energy loss while bringing the mechanics of casting into a predictable pattern.

Conclusion

There is not necessarily a best atlatl and dart system. As we have seen, atlatl systems in recent native contexts exhibit variability. Some atlatls are rigid, some flexible, and none have stone weights. But it has been noted that there is an emerging preference for flexible shaft, weighted atlatls among modern-day competitors (Palter 1998). I have found, in my personal rediscovery of the atlatl, that a flexible shaft, weighted atlatl is part of my ideal system. I have made my best attempt to explain why this is, but there are still too few scientifically based studies to refer to in this explanation (Baugh 1998; Butler 1975; Howard 1974; Peets 1960; Perkins 1992). I conclude that we still have a long way to go before we can comprehend the highly honed skills of competitive atlatlists through the rational perspective of physics. However, it seems likely that the current atlatl "renaissance" will help to encourage such a reconciliation.

Acknowledgements

I wish to thank Alan Leveillee for volunteering his services as proofreader and critic, and for his encouragement in the translation of these interests into written form. This article is a synthesis of a paper presented at the 42nd annual meeting of the Northeastern Anthropological Association.

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A Cache of Greene Points from the Pringle Site (19-MD-18), Tewksbury, MA.

Eugene Winter

Introduction

Growing up in rural Tewksbury Massachusetts, I spent a great deal of time exploring along the Shawsheen River. One day, while digging worms to go fishing, I found a projectile point. After widening the hole and removing the loose dirt, I realized that there were four more, all clustered tightly together. This cache was located in what appeared to be a slight pocket beneath the plow zone at the base of the loam. Although I looked carefully, even digging down into the subsoil, I could not see any evidence for a pit or other feature. I was surprised to find this cache because it was located in the middle of a field yet, somehow, it had escaped the plow. Apparently slope wash from the slight rise to the north had deepened the soil. Because Henry Pringle, the farmer who owned the land, plowed only with a horse the cache remained intact. This cache was donated to the Robert S. Peabody Museum of Archaeology (RSPM) in 1995.

The Cache

The five points that make up this cache were found lying parallel in a tight cluster in the dark brown loam only one or two centimeters above the yellow brown sandy subsoil. The cache was located east of the driveway about one hundred and fifty feet south of the Pringle's house. Though they range in size, all five points are lanceolate in shape, broadest at the midsection and have straight to slightly excursive bases. See Figure 1. Two have more

![Figure 1. The Pringle site cache.](image-url)
defined edges towards the base. These points appear to have been knapped with a hard hammer utilizing the locally available black felsite. The primary flaking was definite, controlled and economical while secondary chipping along the edges was minimal. None of these points show any evidence of weathering or patination. Dimensions for these points are summarized in Table 1.

Table 1. Dimensions for the Pringle Site cache of Greene Points. Measurements in cm.

<table>
<thead>
<tr>
<th>Point #</th>
<th>RSPM Number</th>
<th>Length</th>
<th>Width</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>95.6.1</td>
<td>11.8</td>
<td>2.9</td>
<td>1.5</td>
</tr>
<tr>
<td>2</td>
<td>95.6.2</td>
<td>8.9</td>
<td>2.6</td>
<td>1.3</td>
</tr>
<tr>
<td>3</td>
<td>95.6.3</td>
<td>7.7</td>
<td>2.7</td>
<td>1.3</td>
</tr>
<tr>
<td>4</td>
<td>95.6.4</td>
<td>6.7</td>
<td>2.7</td>
<td>1.0</td>
</tr>
<tr>
<td>5</td>
<td>95.6.5</td>
<td>6.5</td>
<td>2.3</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Point #1 (95.6.1). The largest of the group, this point has long excurvate sides, an irregular base, very little secondary chipping and a blunt tip. There is no evidence of grinding or any use wear along the sides or base. This point is thicker than the others.

Point #2 (95.6.2). This point is more tapered towards the basal end and squared off at the base. There is no evidence of wear or grinding along the edges or base. This point closely resembles point #5 in form and degree of finishing.

Point #3 (95.6.3). This point is more ovate in form although asymmetrical with one strongly excurvate side and a rounded base. This piece has the unfinished feel of a preform.

Point #4 (95.6.4). This point is similar to point #3 although it is more symmetrical and has slightly defined shoulders. More effort was made to straighten the base while the tip appears not to have been completed.

Point #5 (95.6.5). Like point #2, this piece may represent a completed specimen. It is asymmetrical with one side strongly excurvate and the other exhibiting a slight shoulder. The basal portion tapers slightly to a squared off base.

Typologically, these points fit well within Funk’s definition of Greene points. In eastern New York, Greene points occur in Middle Woodland contexts first appearing during the Fox Creek phase, \(^{14}C\) dated between 1,590 and 1,500 BP and persisting until about 1,150 BP. Greene Points were also recovered at the lowest levels of the Cunningham site on Martha’s Vineyard \(^{14}C\) dated at 1,550±80 BP (Ritchie 1971:122).

The Pringle Site (19-MD-18)

The Pringle site is located on a small terrace along the east side of the Shawsheen River approximately 20 feet above the river bed. Although basically flat, the surface of this terrace is slightly higher on the north and south end leaving a slight saddle in the middle. See Figure 2.

According to Henry Pringle, the site had been plowed for many years and every spring and fall, collectors would follow as he plowed. A large number of artifacts were reportedly found. Pringle himself occasionally found arrowheads and pottery but did not save them. Apparently the site was well enough known that the words ‘Once an Indian camp’ appear over the Pringle site location on an 1875 map of Tewksbury (Bullen 1949:51).

The Pringle site is best known from the investigations of Ripley Bullen who conducted a survey of archaeological sites in the Shawsheen and upper Ipswich river valleys.
Figure 2. The Pringle site (after Bullen, 1949). Star depicts location of cache.

between 1942 and 1946. Based on a series of test excavations including one area covering 250 square feet, Bullen concluded that at least two different occupations were present at Pringle. The ‘earlier one’ was represented by corner-removed, small triangular and small stemmed points that were recovered from the yellow-brown sand. A ‘later’ occupation was represented by pottery, a worked piece of graphite, large triangular points and points with narrow side notches, all of which were found in the loam (Bullen 1949:54).

Today, with the benefit of much more fieldwork and better artifact typologies, Bullen’s description can be expanded and refined. Among the artifacts he illustrated from the ‘earlier’ component are Middle Archaic Stark and possibly Neville points as well as a range of Late Archaic forms including Brewerton Eared Triangle, Atlantic and Small Stemmed points (ibid. Plate IX). The artifacts from the ‘later’ occupation include Levanna-like triangular points and grit tempered, cord marked pottery typical of the Middle Woodland period (2,000 to 1,000 years ago). Re-examination of Bullen’s collection at the Robert S. Peabody Museum also revealed the presence of a Greene point base recovered from Test Unit V and initially cataloged as a ‘worked fragment’. This specimen is the basal half of a point 4.5cm long, 2.8cm wide and 1.2cm thick. If whole, I estimate that this point would have been approximately 8cm in length. It is made of a dull red felsite, possibly from a source in the nearby Lynn volcanics. The flaking that characterizes this point is very similar to that described for the cache specimens. Other artifacts found at the same level within Test Unit V included a lanceolate Fox Creek point with a straight base, a worked fragment of crystal quartz and a large piece of scored graphite.

Among the other distinctive Middle Woodland lithics recovered during Bullen’s excavation are a scraper of black chert, an elongated (4.8cm) lamellar blade of gray felsite and a flake of brownish-black chert. Re-examination of the ceramics from Pringle suggests that three different Middle Woodland vessel lots were present. The first is characterized by thick (1cm) grit tempered body sherds smoothed on both exterior and interior surfaces. One neck/rim sherd tapers to a flat, slightly everted lip 7mm thick. The second vessel lot is also grit tempered but decorated with diagonally applied cord marking on the exterior. A rim fragment of this ware has a slightly rolled-over lip that has been flattened and decorated with diagonal cording. The final vessel lot is represented by a single grit tempered body sherd with a line of dentate stamping over a corded exterior surface.
Other Examples

One additional cache of Greene points has been reported in northeastern Massachusetts. At least four Greene points were found by William Boutwell in 1954 near Deer Jump Brook. This was a traditional fording place at the bend in the Merrimack River near the Tewksbury/Andover town line. Unfortunately these points are no longer available for study but in size, shape and lithic material, the Greene points from Deer Jump were comparable to those of the Pringle site cache.

Greene points have also been recovered from other sites in the lower Merrimack drainage. Luedtke reported a Fox Creek presence at the multi-component Shattuck Farm site in Andover, MA. She identified Locus G as a ‘nearly pure’ Middle Woodland component, based primarily on the ceramics recovered, and speculated that this was a small sturgeon fishing camp occupied during the spring (Luedtke 1985:298-99). While no diagnostic points were recovered from Locus G, analysis of private surface collections from the site included four Greene points and fourteen Fox Creeks. The four Greene points were all made of felsite. Most of these specimens were from the Otis Shattuck collection, now at the North Andover Historical Society (ibid. p. 287, 341). A similar Fox Creek component is known from the Call Farm site on the Concord river in North Billerica. Here, Greene points have been recovered along with fabric or net impressed pottery.

Conclusion

A cache of Greene points plus the re-examination of artifacts excavated by Ripley Bullen indicate the presence of a Middle Woodland component at the Pringle site. While it is clear that Greene points are good markers for the Middle Woodland Period, they raise as many questions as they answer. The function of these points remains unclear. Some appear to be finished projectile points while others seem more like preforms. Which were they? Could they have functioned as both? Why were Greene points cached? What was their relationship to Fox Creek and other Middle Woodland point styles?

At present it is difficult to answer these questions in part because Greene points are poorly dated in eastern Massachusetts. The author hopes that this article will stimulate more interest in the reporting of other Greene point caches, and that new information will help to clarify their role in culture of Middle Woodland people.

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An Educational and Public Outreach Project in the Blackstone River Valley National Heritage Corridor

Alan Leveillee and Joseph Waller, jr.

Abstract

The Educational Programs Department of The Public Archaeology Laboratory, Inc., (PAL), developed a field experience in archaeology in 1998 as an element of curriculum for Middle schools in the Blackstone River Valley. Funded by the National Park Service, the program integrated archaeological inquiry within The Blackstone River Valley National Historic Corridor Preservation Partnership Program and provided the public with a hands-on introduction to the past.

Introduction

Despite commendable efforts in the last decade to present archaeology to the public at large, we practitioners have, for the most part, remained underground - both during and following our consideration of the buried past. Many of us would frankly prefer not to have to deal with the public. Yet we capitalize on our image and have come to expect recognition from that same public. As a discipline, we benefit from romantic perceptions of discovery, adventure, and intellectual intrigue. And I venture that more than just a few of us were lured to our profession’s shores by these still seductive Sirens.

We can be eccentric, it’s practically expected. We can be cerebral and withdrawn. We can be cool and witty. We’re archaeologists. This is all true. But unless we get better grounded in the real world of the general public we will, sooner or later, become dinosaurs. And like dinosaurs we’ll be as obsolete as we are fascinating. That’s why reaching out to involve and educate the public is an important and necessary facet of what we do. Continuing to do archaeology in the future may depend on demonstrating that we are both relevant and applicable to the real world. We can stay cool, but we can’t afford to be esoteric. We have to engage with living people and speak to the contemporary issues of the day.

At PAL, we support an ongoing Educational Programs Department, these programs being the conduits to disseminate the results of our investigations to the public. Our products range from popular reports to curriculum design and field experiences. This article focuses on one recent example.

A Thumbnail History of the Blackstone River Valley National Heritage Corridor

In 1790, Samuel Slater began production at the first water-powered cotton textile factory on the continent, an enterprise regarded by historians as the seminal event of the American Industrial Revolution. The water source that powered that factory, and the beginning of that
revolution, was the Blackstone River. The River’s forty-six mile length and its watershed became a focal point of manufacturing during America’s Industrial Age, with forty dams along its course and scores of villages surrounding castle-like textile mills. While the surrounding hills supported Yankee farms that supplied goods to feed workers below, the industrial centers attracted French Canadians, Germans, Irish, English, Swedes, Dutch and many more. Seekers of refuge and dreams settled in neighborhoods where transported cultural identities and traditions were reinforced. Like the mills themselves these peoples left indelible marks on the cultural landscape. Recognizing the importance of the Blackstone River Valley to our history, the United States Congress created the Blackstone River Valley National Heritage Corridor in 1986, declaring it nationally significant. That significance is characterized by a unique articulation of natural, historical, and cultural resources across twenty-four municipalities in two states, Massachusetts and Rhode Island. The Corridor is funded through the National Park Service, but unlike traditional parks is not government owned, rather managed by a combined public-private partnership.

The Blackstone River Valley National Historic Corridor Commission is charged with administrative oversight. They support preservation, education, and management initiatives. Among their goals is to encourage partnerships between shareholders for long-range planning. One way they do this is to provide grant monies. $300,000.00 was made available in 1998 for projects in the Corridor and the Commission issued a call for proposals. At 4:45pm on the day they were due at 5:00, we hand-delivered a proposal. PAL’s acquaintance with the Blackstone River Valley began in the 1970s with a series of investigations along the I-146 highway corridor during which we identified and documented approximately twenty archaeological sites. Then again, in 1990, we returned to the banks of the Blackstone in Millbury for a routine survey and spent two seasons excavating a 3,500 year old secondary cremation burial complex. In that time and since, we’ve become at home in the River’s prehistoric past. In the grant proposal we suggested that archaeology would open entirely new windows to the corridor’s history. The river’s prehistory is virtually unknown to the public. Most people would be surprised, for example, to know that more than 3000 years ago Native Americans were quarrying soapstone along the banks of the Blackstone and trading it all over the Northeast. These ancient peoples also had sophisticated belief systems, cremating and mourning their dead in elaborate ceremonies to insure their entry into the spirit world. We suggested that by including archaeological programs into the Heritage Partnership, the commission would enable consideration of the histories not written on paper but in stone and upon the landscape. The grant challenged that, if the commission could see the benefit of someone picking up a broken fragment of ceramic and consider it as a clue to the past, they would see the need for this kind of programming. By embracing archaeology as a partner, they would be looking not at three hundred years of history but at over 3000 years. We talked about networking, coordination, committees, and so on, but the bottom line was that through archaeology we could help open the past. They liked it and we were funded for a pilot project.
The Logistics of Finding a Site

We had a basic approach for what to do. Locate a few known sites that were threatened but not protected by preservation legislation, pick a team and conduct site examination excavations, inviting the public to observe the process. It seemed pretty simple. But when we met with the Park Service it became clear that what was expected was a more hands-on public participation approach. They also felt we should confine ourselves to one state, Rhode Island. We began to realize there could be problems excavating sites with public volunteers. Additional issues such as site security, looting, and angry Native Americans also ran through our minds.

Paul Robinson, the Rhode Island State Archaeologist, was helpful in supporting the program and had some good ideas: to concentrate on a historic site, and find one close to Heritage Commission headquarters in Woonsocket to maintain visibility. We worked with the Woonsocket Neighborhood Association, a city-sponsored organization that rehabilitates old mill housing into affordable apartments. They had several candidate locations to provide a working site. After a morning in the field we selected the back yard of 141 Pleasant Street, a ten minute walk from downtown Woonsocket, and about a five minute walk from the nearby Museum of Work and Culture.

The standing structure at 141 Pleasant Street is an unimpressive turn-of-the-century mill workers’ tenement. The surrounding streetscape is an uncoordinated tapestry of single residences and apartments of mixed economic pedigree. It is a neighborhood on the rise and had seen both better and worse times. Out of context it doesn’t look anything like what the public would expect an archaeological site to be. But it fit the bill nicely - it had a small fenced-in back yard - good for crowd control. And under the umbrella of a City managed lot, the liability issues of digging on private property could be eased. One question remained: was anything there? If the public was going to participate we had better be finding something to keep interest up. A few auger probes told us it was promising, and we committed. According to the construction schedule we had the month of October and into November as the window for fieldwork.

Involving the Public

Thinking about how best to orchestrate the fieldwork it dawned on us that schools would be in session, and that targeting classrooms would be the answer to public involvement. We prepared flyers and targeted the twenty five or so Middle and Junior high schools in the region. Press releases went to local newspapers. We visited with the Museum of Work and Culture and formed an agreement to integrate group visits, and to have the Museum as a back-up in bad weather.

Printed materials went to schools in early September. We sat back and waited, fearing that we might hear nothing. Within two weeks, all the available open days were booked and we sent out briefing materials, and confirmations. In the meantime, newspaper articles about the program spurred inquiries from the general public. We decided to host a ‘public day’ at the end of the project and replied to individual inquiries, inviting them to join us.
In the Field

Under the supervision of PAL professional staff, over 600 school children excavated the site. Each day in October one or more buses would pull up and a highly charged research team of between twenty and sixty screaming kids accompanied by a few shell-shocked teachers would spill out in front of the site, look around, and come to the conclusion that they had been ripped off. The setting proved a valuable prop. In our introductory remarks we were able to talk about context. Pointing out the neighborhood, we noted that things change over time and the patterns of the landscape and the artifacts it held could be read and interpreted. We promised that within an hour of their arrival on the site, as they became archaeologists, the surroundings would disappear as they became focused on what they were finding.

After ten minutes of introduction, teams were established and briefed on filling out tags, using a metric tape, and trowel techniques. They were then assigned a 1m x 1m excavation unit, which we had previously established on a site grid. A five gallon bucket contained all the necessary forms and equipment and one or more screens were at each station. Each student was assigned a task; recorder, screener, bagger, and two excavators in the unit. They switched jobs every twenty minutes or so. All digging was by trowel. We didn’t want kids swinging shovels for safety reasons, and we wanted to emphasize controlled excavation. PAL professionals floated from unit to unit to answer the unending “Is this anything?” and to help keep records straight. Each unit was excavated in ± 10cm vertical levels. They loved it. See Figure 1.

Figure 1. Students at work.

A typical day on the site included: excavation in the morning, lunch on-site, another hour or so of digging, then a visit to the Museum of Work and Culture. Other groups walked to the nearby falls and local mill sites before heading back to their schools. Lunch was always a good time to discuss finds and speculate on their meanings. Each afternoon, once the groups had left, we straightened walls, leveled floors, checked for left-behind gloves, hats, and so on, and prepared for the next day. Each afternoon recovered materials were returned to the PAL laboratory and quickly scanned to try to catch any glaring recording or provenience errors. Admittedly, a percentage of the assemblage was lost, but overall the groups did well.

The mix of chattering on site, excitement of discovery, and the laughter of the kids was like music. Each school group left the site happy, and teachers and parents praised the dig experience as excellent among field trips. We
were very pleased and encouraged by these responses. We were also fortunate. We didn't lose a day to bad weather, and had only a few minor medical issues. The media covered us and we got some good press. One enterprising school videotaped their experience and produced a twenty-five minute documentary, accompanied by the musical score from Jurassic Park.

The Site and What It Yielded

The topography across our site area was generally level. Contrasts between abutting lots indicated that landscaping on the site included some filling. This was confirmed in stratigraphic profiles, revealing subsoils covered by a well-developed A horizon, buried by two or more fill strata. Since the primary objective of the exercise was introductory, we collected and subsequently catalogued materials within arbitrary 10cm vertical levels, sacrificing some of the depositional strata we would ordinarily recognize. However, it was acknowledged early in the fieldwork that we would have to assume some unusual license, given the skill level of our crews. Large-scale project goals were not focused on how we interpret the site but on introducing general concepts to school children. Also the distinction between which materials were brought in with fill and which were deposited in-situ was recognized as academic.

In total, we excavated twenty-four 1x1m units in the perimeter of the back yard parking area. We have provided data on the site and its assemblage to schools in formats that allow them to work with and interpret it creatively. We've also broken down summary information in material types, stylistic classes, and functional groups across the assemblage and asked the students to come up with explanatory scenarios to account for the information presented. The products for schools include a historical outline based on documentary records research and a series of exercises, questions, and assignments. Representative samples of artifacts are available to work with in their classrooms. There is plenty to work with; the collected assemblage includes 10,448 cataloged artifacts. See Figure 2.

Figure 2. A sample of artifacts recovered.

As an educational program, it was a successful experiment and provides a working model for public participation. We're encouraged and are optimistic about continued future funding. The Blackstone Historic Corridor Commission and Park Service has gotten their money's worth in press coverage, linking agencies in a preservation partnership, and tying their goals into local schools and the community.

Most important, the program worked well as applied archaeology and educational outreach. Over 600 children and their teachers got to meet, work with, and talk to archaeologists who are digging sites and learning about the
past in their own back yards. We presented a program that reached a refreshing diversity of kids and gave them a message that, they too, can aspire to be real world archaeologists.

Satisfying One Critic

In summary and in closing, we offer the experience of Tony, a young adult whose quote "I can't read so good, but I like archaeology" became the title of this article. He joined us for the public day on-site. On his arrival it didn't take long to realize that the friend who accompanied him was also his supervised living councilor. As we talked, Tony told us that his social worker had helped him write his letter asking to join us. He said he loved to watch shows about archaeology and knew all about it. He explained because he was in a car accident as a kid, schools wouldn't take him. Reading and writing are too hard for him. Through his day on the site, he worked one-on-one with PAL staff archaeologist Sherri Knight-Cloud. See Figure 3. Sherri was patient and instructive as Tony excavated while constantly talking about Troy, Egypt, Stonehenge and just about everything on The Discovery Channel.

Figure 3. Tony C. and staff archaeologist Sherri Knight-Cloud.

His discussion was intermittently punctuated by shaking his head and telling Sherri that he was having fun, but what we were doing was not at all like television. At the end of the day, as he was leaving, we thanked him for helping us. He turned to go, stopped, and came back to shake our hands. As he did he leaned close, lowered his voice a little, and said he guessed that being an archaeologist was about the best job in the world. He was right.
Avocational-based Site Registration:  
A View from New Jersey

Peter Pagoulatos

Abstract

Public outreach and education play an increasingly important role in archaeology today as public funds diminish for archaeological research and development pressure increases on private lands. The New Jersey Site Registration Program was developed in 1997 in an attempt to register sites discovered by avocational (nonprofessional) archaeologists across the State of New Jersey. A total of 457 archaeological sites were registered over a two-year period by student research assistants who conducted structured interviews and recorded sites on standardized registration forms. This study shows that public outreach and education do work and that positive relationships to document the past can be developed and maintained between professional and avocational archaeologists.

Introduction

Public outreach and education between professional and avocational archaeologists have received much attention recently (Cunzo 1993; McCarron 1993; Pagoulatos 2001a). However, since the Antiquities Act of 1906, protection of archaeological resources has been primarily on federal lands; relatively few laws have been enacted to protect and preserve archaeological sites on state and private lands (NJPC 1980; ETO 1993). With funding constraints in the public and private sector, the vast majority of archaeological research undertaken today is usually in cultural resource management; most contracted work takes place on federal lands or with federal funds for development on private lands. Since most land in the United States is privately owned, this leaves a large portion of archaeological resources essentially unprotected by current CRM laws (Staeck 2002:297).

With this dilemma, the role of the public becomes increasingly important since archaeological resources are finite and developmental pressure is not. Public outreach and education are fast becoming a primary goal of archaeology. The best way to protect and preserve archaeological sites is to teach people the importance of ethical and proper ways of collecting artifacts as well as recording sites. Once artifacts are taken out of their original context (provenience), the relationship between location (place) and the potential patterns we are attempting to detect in the archaeological record is forever lost. Too frequently, professional archaeologists meet interested citizens who have the classic cigar box full of arrowheads, with little or no known provenience. Casual and uncontrolled surface collecting of artifacts without knowledge of provenience destroys part of the past. Many private citizens fear that reporting archaeological sites to colleges, museums or state agencies will lead to the confiscation of their artifacts, but this is simply not true. A higher degree of trust must be cultivated, which will most certainly lead to a more positive relationship between both professional and avocational archaeologists (Staeck 2002:20-21).
The majority of avocational archaeologists I have had the pleasure to meet and get to know in the State of New Jersey try to do the right thing; they are truly interested in archaeology and want to increase their, and the public's, understanding of past lifeways. The majority of avocational archaeologists surface collect sites, and some even keep accurate records and document their locations on United States Geological Survey maps. With so few funds available for archaeological research, especially on private lands, the avocational archaeologist serves an important role in advancing our knowledge of the past. Many of these avocational archaeologists have been collecting from specific properties over several decades and have a practical knowledge concerning landforms and corresponding artifact assemblages which serve as a valuable resource to the professional archaeologist. Many avocational archaeologists are members of the Archaeological Society of New Jersey and other local organizations. Many also read professional journals and resources specifically oriented toward the nonprofessional archaeologist (Robbins 1965; McMillon 1991).

As part of this current study, two primary questions were addressed. First, why work with avocational archaeologists? And, secondly, why should avocational archaeologists register their sites? First, avocational archaeologists have a vast breadth of knowledge about the local archaeological resource base, and as they get older, retire and pass on, many of their collections are sold or lost; thus, in a sense with the passing on of an avocational archaeologist we lose a portion of the archaeological record and its corresponding oral history. Secondly, avocational archaeologists should register (record) sites because it is the responsible thing to do; documentation could simply include the completion of a site registration form, including the recordation of discovered artifact classes, current site conditions and a location on a USGS map.

With these basic concerns, the goal of the New Jersey Site Registration Program (NJSRP) was to attempt to contact avocational archaeologists throughout the State of New Jersey and try to educate them about the ethical responsibility of site recordation. Also, an attempt was made to interview individuals and record (register) as many prehistoric sites as possible. This paper describes the research methods used, presents results and makes recommendations.

Methods

In 1997 and 1998, Brookdale Community College (Lincroft, New Jersey) initiated a statewide data compilation of Native American sites in New Jersey. This project involved the solicitation of unregistered site information from avocational archaeologists who have worked in and around the State of New Jersey over the years. Data was collected by research assistants using a standardized informant interview format and was compiled into a technical report (Pagoulatos 2001a).

In 1996, Brookdale Community College contacted the New Jersey Historic Preservation Office (NJHPO), the New Jersey State Museum, the New Jersey Department of Transportation, the New Jersey Pinelands Commission, Dr. Herbert Kraft of Seton Hall University, and the Archaeological Society of New Jersey (ASNJ) to present a proposal for a New Jersey Site
Registration Program (NJSRP). The concept received a favorable response and several individuals offered valuable suggestions to enhance the effectiveness of the project.

Initially, the NJHPO provided a comprehensive directory of state historical societies, museums, county-specific cultural and heritage commissions, as well as a list of avocational archaeologists who have worked in the State of New Jersey over the years. Also, the ASNJ provided a list of society members with their corresponding addresses and telephone numbers. Subsequently, form letters were sent out by the Department of Anthropology at Brookdale Community College to over two hundred organizations and individuals, including academic institutions, local historical societies and avocational archaeologists, describing the NJSRP and requesting for their participation in the study.

Simultaneously, a call for research assistants was made to the Archaeological Society and several two and four-year academic institutions throughout the State of New Jersey. Form letters were sent to Society members and anthropology departments soliciting research assistants to participate in the study. Subsequently, follow-up calls were also made to ASNJ members and college faculty. Finally, I visited several colleges and local historical societies to present the project to students, faculty and other interested parties.

The research assistant (RA) pool was largely composed of individuals from the Archaeological Society, several New Jersey colleges and some local high schools. Individuals first participated in a one-day workshop to learn about the program and receive instruction on informant interviewing techniques. Subsequently, meetings were held once per month at Brookdale Community College with the Director of the NJSRP (Peter Pagoulatos, Ph.D.) to discuss ongoing research progress. The RA pool typically numbered between 10 to 12 individuals.

The NJSRP research process involved several sequential steps prior to the actual informant interviews of avocational archaeologists by newly trained RAs. First, RAs were assigned geographic (county-specific) territories to place follow-up calls with local historical societies, museums, cultural and heritage commissions, and individual avocational archaeologists to gather information on potential (state-unregistered) site locations. Once the follow-up calls were completed, RAs worked in teams of two to arrange appointments with avocational archaeologists to conduct standardized interviews. All scheduled RA visits with avocational archaeologists were then reported to the Director of the NJSRP.

Informant interviews were conducted in the residence of the avocational archaeologist. The RAs would arrange a convenient time to visit with the avocational archaeologist, get acquainted, discuss the NJSRP, conduct the actual interview, as well as view and photograph the appropriate collection. RAs conducted structured interviews which consisted of asking the avocational archaeologist standardized questions, in a fixed order. This procedure made the collected data more systematic, comparable, and better-suited for statistical manipulation (Bailey 1994; Spradley 1979; Bernard 1994). RAs used a standardized site registration form (SRF) to record locational, environmental and cultural
data; also, a notebook journal was used to add detailed information to the specific questions on the form. Once the SRF had been completed, the site was placed on a United States Geological Survey (USGS) 7.5" Quadrangle Map. Site placement on a USGS map allowed for detailed recording of environmental information, such as distance to water, soil, drainage, slope and aspect. Finally, the collection was color photographed with a 35mm camera with a corresponding scale, for size comparisons. If a site visit was necessary, the Director of the NJSRP was notified, so as to gain proper clearance with respective landowners.

It should be noted that there were ethical considerations with respect to informant interviewing avocational archaeologists (Green 1984; Messenger 1989; Vitello 1995). The avocational archaeologist had the option of total confidentiality and anonymity when it came to site reporting. They had the option of fully registering the site with the State of New Jersey, or simply contributing site information to the NJSRP at Brookdale Community College. If the avocational archaeologist chose the latter, the site would appear in future reporting only as a NJSRP number (not a Smithsonian Trinomial Site Registration Number), and only information such as drainage location, site chronology, and function would be available. The actual site location was not to be made public (Pagoulatos 2001a). Follow-up interviews were then conducted the subsequent year with each avocational archaeologist to collect new provided site information.

Material Analyses

As part of the project, material culture analysis was completed by the RAs. RAs would assess collections housed in historical societies, museums, academic institutions, or with individual avocational archaeologists. Collections were viewed and recorded into standardized site registration forms. Subsequently, diagnostic artifacts were photographed, using 35mm color film.

Artifacts (anything manufactured or modified by human beings) were subdivided for purposes of analysis into different classes such as clay and stone. Clay artifacts (pottery, pipes) were classified by attributes such as size, thickness, element type, manufacturing technique, tempering and decoration. Stone artifacts (lithics) were first separated into chipped stone (produced by fracturing of flakes from a core by way of percussion or pressure flaking) and ground stone (produced by abrading and grinding techniques) technologies. Ecofacts consisted of organic items not manufactured by humans which were sometimes associated with archaeological materials, such as bone, shellfish and vegetable remains. Artifacts and ecofacts were then compared to documented type collections and reference materials for identification purposes. Features were classified into specific categories (i.e., trash pits, hearths, postmolds) on the basis of informant descriptions, site plans, occasional site visits by RAs (to inspect exposed features), and photographs, in conjunction with associated cultural items.

For the purposes of quick and easy artifact identification, a manual was developed by the NJSRP to assist RAs in identifying diagnostic lithic materials (projectile points, form tools) and pottery types found in the State of New Jersey. This manual was used by RA
teams when they visited informants (Pagoulatos 1997).

**Site Statistical Analyses**

Site data was collected by RAs using a standardized informant interview format. Once information was collected and recorded on the site registration forms, a simple statistical measure referred to the Activity Diversity Index (ADI) was used, which was designed to assess the range of human activity at archaeological sites. This approach was used on sites for which quantifiable counts of specific artifact classes did not readily exist. The ADI was determined by the presence or absence of forty major artifact classes.

The ADI was calculated by adding up the total number of different artifact classes from a particular site assemblage and dividing this sum total by the total number of categories (40) recorded in this study. The ADI ranges from 0 to 1.00. For example, a site containing only two different artifact classes (i.e., points, scrapers) would yield an ADI of 0.05. In this example, the presence of only projectile points and scrapers suggests that the hunting (and possibly processing) of mammals was an important activity at this location. Therefore, this ADI reflects a rather specialized location where a limited range of activities took place. By contrast, an ADI of 0.75 would contain 30 of 40 possible artifact classes, and would represent a much more variable assemblage, reflecting a wider range of activities.

Once all the raw data was subjected to statistical analyses, a technical report was compiled by the NJSRP (Pagoulatos 2001a). The report is currently on file with the Department of Anthropology at Brookdale Community College. The report includes a management summary describing the results of the program, a copy of the training manual which was used by the RAs, and the corresponding tabulated raw site data; site forms are not included with the report. Site forms are considered confidential and are currently on file (separate from the report) at the college.

**Results**

Over a two year period, 13 RAs collected site data from 15 avocational archaeologists and two local historical societies with collections. A total of 457 Native American sites were registered as part of the NJSRP (Pagoulatos 2001a). Sites were registered in all but four New Jersey counties, with over half (51%) from Burlington County; sites were also registered from Atlantic, Bergen, Camden, Cumberland, Essex, Hudson, Gloucester, Mercer, Monmouth, Morris, Ocean, Passaic, Salem, Somerset, Sussex and Warren counties. See Figure 1. The vast majority of site locations (>98%) consisted of uncontrolled surface collected materials; only a small number of sites had been subjected to unsystematic archaeological excavation (Pagoulatos 2001a).

The ADI measure shows that most sites (88%) represent loci (ADI range .02 to .25) where a rather limited range of activities took place; relatively few site locations (<5%) reflect multiple task loci. Although most site locations were reused by different prehistoric groups, the majority of components represent Late Archaic to Late Woodland occupancy; relatively fewer occupations yield diagnostic artifacts which
Figure 1. New Jersey counties where new sites were registered.

date from the Paleo-Indian to Middle Archaic periods.

On the basis of identified cultural chronology, drainage uses, settlement patterns and ADI, current NJSRP data are consistent with other regional (Mounier 1978; Cavallo and Mounier 1983) and state-wide studies (Chesler 1982; Kraft 1986; Pagoulatos 1998, 2001b). For example, a total of 233 site occurrences have been reported from Burlington County drainage systems including the Rancocas, Assiscunk and Crosswicks. These interior tributaries of the Delaware River typically represent limited activity loci (90%) with low ADIs (0-.25). Less than 10% of the sample represents site locations with moderate to high ADIs (> .25). Also, when examining ADI by number of cultural components, sites with a lower ADI (<.25) average a mean number of 2.1 cultural components per site, while sites with a moderate-high ADI (> .25) have a mean of 4.9 cultural components per site. These data may indicate that site locations (landscapes) which were revisited by a greater number of prehistoric groups tend to produce higher activity variability than those locations which were visited less frequently (Pagoulatos 2001a).

Recommendations

Public outreach is of utmost importance in archaeology. Professional archaeologists need to work closely with avocational archaeologists in order to make private collections more accessible for research and interpretation. Programs such as this should be considered elsewhere, especially on private lands where development pressures are great and funds to pay for archaeological research are limited. Avocational archaeologists also provide important oral history about previous uses of the land. As they retire, move or pass on, their collections are often dismantled or lost along with the oral history that accompanies them. Therefore, it is imperative that avocational archaeologists be interviewed and their sites documented, prior to the loss of invaluable information about the past.

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Editor's Note.
In Massachusetts, the Massachusetts Historical Commission (MHC) serves as the State Historic Preservation Office as well as the office of the State Archaeologist. A cordial relationship has long existed between the MHC and the Massachusetts Archaeological Society. In fact, the MHC's archaeological site files were originally based on those at the Bronson Museum and have been updated periodically through the generous assistance of the MAS members who have permitted access to their collections. Society members are encouraged to continue sharing their knowledge of Massachusetts' archaeological sites with the MHC so that these resources can be protected and preserved for future generations.
Adaptation and Resistance: 
A Contact Period Component at Den Rock in Lawrence, MA.

Jeffrey Robert Carovillano

Introduction

Den Rock is a massive rock formation located on the border of the towns of Andover and Lawrence in northeastern Massachusetts. Even before excavation began, it was clear that this would not be just another cultural resource management survey. Background research indicated that the project area, slated for new housing, had been known to collectors of Indian artifacts for over 100 years. A spectacular bear's head effigy gouge found here is pictured and described in Willoughby's *Antiquities of the New England Indians* (Willoughby 1935: 37). Local histories also documented the importance of this area with descriptions of Indian cornfields and other Native American activities (Bailey 1880).

The likelihood of a Native American presence was apparent during a walk-over reconnaissance of the area. The topography, which included a high, steep cliff, provided a panoramic view of the adjacent wetlands and stream as well as shelter from the wind. The gently sloping, well-drained ground furnished an ideal landscape for Native American campsites and villages. Small caves and cracks in and around the cliff could also have been used for shelters, food storage or caches, an idea supported by the discovery of a utilized quartz end scraper on a rock shelf deep within one of the cracks. Most intriguing was a deeply scarred and fire-blackened vein of quartz mixed with feldspar and mica. With a mass ofdebitage piled beneath it, this strongly suggested quarrying activity at the site.

Archaeological examination of the Den Rock area included an intensive survey, site examination and data recovery undertaken by Timelines, Inc., in 1997. During this project, a great deal of new information relating to the Native American occupation of the site was obtained. Six new Native American archaeological sites were discovered and designated 19-ES-703 through 19-ES-708. The most significant was 19-ES-704. The other five sites were determined to be short-term campsites with evidence of isolated food storage and/or tool making. 19-ES-704, which is directly adjacent to the rock formation, appears to have been inhabited on a seasonal basis throughout the Woodland and into the Contact Period. Although analysis of the thousands of artifacts and numerous features encountered is ongoing, it is possible to provide a synopsis of the results. These topics are explored in more detail in my Master's thesis (Carovillano 2002). This article focuses on two subjects. The first is evidence of ceramic vessel production and associated quarrying activity found at the site. Second is the evidence for a Contact Period component at Den Rock.

Ceramics at Den Rock

The largest group of archaeological materials at Den Rock were minerals that had been quarried and crushed to make temper for earthenware vessels. These included quartz, feldspar, muscovite, and possibly pyrozene (Haynie 1999: 1-13). Several areas of the rock face contain large veins of these minerals (predominantly quartz) that appear to have
been quarried. The rock face showed evidence of extensive battering and fire blackening, possibly in an attempt to make the rock more friable. Large amounts of mineral debitage were found directly beneath these quarry areas. A large rock-lined hearth and numerous smaller surface fire features were excavated nearby. Each contained large amounts of burnt potsherds and chunks of temper material. A temper-processing workshop was also discovered nearby and contained battered hammer stones and anvils as well as temper material. Over 1304 sherds of pottery and several clay pipe fragments were recovered during the excavation, as was one nearly complete vessel, fragmentary but in situ just below the soil surface. In Lawrence Yesterday and Today, Dorgan maintains that the Peters family had a brick yard at Den Rock, and “to this day there have been burnt and distorted bricks in the ground around the rock” (Dorgan 1918: 186). These discarded bricks were also noted by the excavating archaeologists, and provide evidence that a clay source was located nearby.

An initial analysis of these ceramics has been conducted by Michael Haynie, a graduate student at Harvard University working under the supervision of Elizabeth Chilton. Based on thickness, decoration, temper and other attributes she determined that the Den Rock ceramics were likely to date from the Middle and Late Woodland Periods as well as into the Early Contact Period, or from 2000BP until the seventeenth century. The early Contact Period dates are suggested by ceramic sherds from Den Rock that showed evidence of decorated castellations, applied lobes, frilled collars, constricted necks and thin globular bodies. Decoration techniques include fine incising and circular punctates, all of which are characteristic of Native American ceramics from this time period (Lizee 1994). Also recovered were two ceramic pipe bowl fragments similar in appearance to seventeenth-century European examples. These may be of Contact Period origin as well.

**Contact Period Artifacts at Den Rock**

Several kinds of European materials were found in association with the Late Woodland and Contact Period ceramics at Den Rock. These include copper, glass, ballast flint and an iron gun part that help to date when the site was used by the Pennacook-Pawtucket people. One copper artifact was found. It is a small, nearly rectangular piece of flat-hammered copper. Sheet copper is considered to be the most common temporal indicator of the Contact Period in central New England (Johnson and Bradley 1987). One edge has been scored and folded over, clear evidence of modification. The marks from repeated hammering are also apparent. The object appears to have been recycled from a copper kettle and was probably intended to be made into a tool such as a knife or projectile point (Grumet 1995:43). A similar artifact was recovered at the Bark Wigwams, an early Contact Period site in Central Massachusetts (Johnson and Bradley 1987:12-13). If this artifact was scavenged from a European trade kettle, it could explain why the Indians returned to Den Rock to make ceramics even after they had access to metal cookware. This supports the theory that copper kettles were more valuable as a source of metal than for cooking and that, at least for a while, Native Americans preferred their traditional ceramic vessels for cooking and food storage (Bradley 1987; Johnson and Bradley 1987:13).
A second class of Contact Period artifacts at Den Rock includes eleven small fragments of bottle glass. Due to their greenish tint, relative thinness and angular profiles, the fragments have been identified as mid-seventeenth century English case bottles. An example of this type of bottle is illustrated by Noel Hume who notes that this form was commonly used in the period ca. 1625-1675 (Noel Hume 1969: 69).

A total of forty-six ballast flint artifacts were also recovered from Den Rock. Two of these flint artifacts are modified ballast flint nodules, while the remaining forty-four pieces appear to be debitage, utilized flakes, tools or fragments of tools made from larger nodules. Fourteen of these show evidence of utilization when viewed through a low power microscope. These modified ballast flint pieces were examined for evidence of use wear and an attempt was made to determine the function of any utilized artifacts using examples provided by Luédtké (1998; 1999a; 1999b) and Kenmotsu (1990). The potential for native-made gunflints was of particular interest since a gun part was also recovered at the site. Two criteria were used to identify possible gunflints. One was shape—did the artifact appear to be made to fit the jaws of a snaphaunce or flintlock weapon? Second was use wear—did the artifact display the characteristic chipping, crushing, battering and step flaking on its working edges that occurs when a gunflint repeatedly strikes the steel frizzen of a firearm?

Even with these criteria, identification proved difficult. Native-knapped gunflints are especially challenging to identify due to their lack of uniformity. The fact that spent gunflints were often re-used as strike-a-lights further complicates matters. Despite these challenges, one probable and several possible gunflints were identified from among the Den Rock ballast flint. The most interesting is a small used gunflint made from a gray to dark gray flint with white cortex visible along one side. It is rectangular in outline, wedge or ‘coffin’ shaped in cross section, and has secondary and tertiary flake scars across almost all edges. Significant battering is visible on both ends and is indicative of the type of impact that occurs when a gunflint repeatedly strikes the battery (frizzen) of a flint weapon. The fact that the flint is battered on opposing sides supports Kenmotsu’s belief that gunflints were often rotated several times to make use of unused edges and ensure a good spark (Kenmotsu 1990: 112). In addition to the extensive battering on the ends, the artifact also displays

![Figure 1](image)

Figure 1. Modified ballast flint artifacts; a. gun flint, b. gun flint?, c. strike-a-light..
minor battering and step-flaking along all available edges, suggesting that it was re-used as a strike-a-light (Luedtke 1998: 39). See Figure 1a. This artifact closely matches published descriptions of native gunflints. It is also remarkably similar in size, appearance and use wear to a gunflint from the Conner site, an early Contact Period site in New Hampshire (Potter 1994: 61). Both Kent (1983: 32-34) and Luedtke (1999b: 33) refer to gunflints of this type as bifacial gunflints and argue that these were made exclusively by Native Americans during the Contact Period. The Den Rock artifact appears to be a good example of these native-made gunflints and its small size suggests it was probably used in a pistol.

A second flint artifact appears to be an unused bifacial gunflint. It is a wedge-shaped flake and mottled gray in color. Only slight secondary flaking is visible along the edges and there is no evidence of use wear of any kind. See Figure 1b. However, this object is very similar to gunflints pictured and described by Kent and Kenmotsu (Kent 1983: 31-35; Kenmotsu 1990: 92-124). Perhaps it was discarded due to a visible flaw on the striking edge or lost before it could be used. Its small size also suggests it was intended to be used in a pistol. Several other flint artifacts from Den Rock also exhibit use wear or characteristics consistent with Native American bifacial gunflints, but none of these are definite enough to be conclusive.

At least two other flint artifacts appear to have been utilized as strike-a-lights. These were identified through Luedtke's observation that strike-a-lights usually display steeply angled flaking, frequently unifacial, on different portions of the edge (Luedtke 1998:39, 41). The first of these is made from a mottled gray piece of flint with whitish cortex. It is somewhat rounded in appearance and much secondary flaking and retouching is evident. All of the edges show flaking which could result from repeated contact with a metal object. See Figure 1c. This piece is very similar to a strike-a-light found at the Conner Site (Potter 1994: 61). The second example is a mottled gray chunk of decortification shatter with cortex covering one side. Morphology and use wear for both of these artifacts are consistent with Luedtke's description of strike-a-lights although I was unable to identify the 'visible streaks of iron' which she noted often result from this usage (Luedtke 1998: 39).

One additional and unusual flint artifact is the broken base of a very light gray projectile point. The partial stem shows evidence of hafting. It may have been broken when being retouched and discarded, or kept as a strike-a-light. A similar broken quartz point fragment, reused as a strike-a-light, was found at the Aptuxcet Trading Post in Bourne, MA (Luedtke 1998: 42).

The other nine flint artifacts that showed use wear or retouch were utilized flakes that appear to have been used as scrapers, drills, gravers or blades. They range in color from dark to light gray. One shows signs of hafting, possibly for use as a chopper. In addition to other evidence of use, several of these artifacts also show small amounts of battering on their edges. It is possible that these are gunflint fragments. The bashing could also be from one-time use as a strike-a-light for, as Kent has observed, any piece of broken flint will serve to draw sparks from a hardened piece of steel (Kent 1983: 31). Although these interpretations are difficult to prove, they suggest that ballast flint tools were the 'Swiss Army knives' of the Contact Period.
tool kit, capable of a variety of useful tasks. The remaining twenty-one flint artifacts from Den Rock were un-utilized debitage, waste flakes and shatter.

Native American-made bifacial gunflints also help to determine the dates of occupation at Den Rock more closely. According to Malone, Native people in southern New England did not begin using firearms until the 1620's (Malone 1991: 42). Other experts have observed that bifacial gunflints do not appear in the archaeological record until about 1625 (Kent 1983: 31; Luedtke 1999b: 33). After 1625, bifacial gunflints became relatively common on Contact Period sites as the Indians strove to produce gunflints for their rapidly growing arsenal of firearms. After 1675, the manufacture and use of bifacial gunflints decreased rapidly and by 1700 they occur rarely (Kent 1983: 34).

The final Contact Period artifact found at Den Rock was the cock buffer from a seventeenth-century snaphaunce gun. This object, initially labeled as 'historic trash' in the early stages of laboratory analysis, was correctly identified only after considerable research. This included posting photographs of the artifact on several antique gun and military re-enactment Internet sites. The small, oxidized iron object was determined to be the cock buffer from an early to mid-17th century English snaphaunce firearm by Richard Colton, the curator of the Springfield Armory Museum and a well-known expert on early firearms. See Figure 2. A cock buffer is an iron stop that was screwed to the exterior of a lock plate to arrest the forward motion of the hammer after it strikes the battery (Brown 1980: 71). Cock buffers were found on all snaphaunces. While also seen on early dog locks, they were made redundant by the improved safety features of later weapons and soon disappeared.

Although it is difficult to determine whether the cock buffer came from a musket, carbine or pistol, Colton believes that its small size suggests a pistol. This may be supported by the small size of the gun flint(s) found nearby. Colton similarly believes that the cock buffer is from an English weapon early in the evolution of snaphaunce design. He bases this identification in part on the object's ornate appearance; later cock buffers were plainer.

Colton believes that the cock buffer predates 1655, an opinion supported by examples found on other archaeological sites and in European museums. The most strikingly similar example was found at the Power House site, a Seneca Iroquois village south of Rochester, New York and dating ca. 1635-1655 (Hayes 1985: 22, 73). See Figure 3. Other examples of similar cock buffers can be seen on four English snaphaunce pistols dated ca. 1610-1615 in the collection of the Palazzo Ducale in Venice, Italy (Eaves 1970). Another snaphaunce lock plate with a similar cock buffer was found at the George Sandy’s site, an English homestead near Jamestown, Virginia, occupied from 1630 to 1650. The site report notes that other comparable examples have been recovered in ca. 1610 contexts at James Fort as well as site H.
Figure 3. A nearly complete snaphaunce lock with cock buffer in place. Illustration courtesy of Richard Colton (after Hayes 1985: 68).

at Martin’s Hundred, ca. 1620-1622 (Mallios 2000: 35). Colton also cites similar examples from Fort Pemaquid in Maine and Saugus Iron Works in Massachusetts (Richard Colton, personal communication, June 2000).

Based on comparisons between the Den Rock example and other snaphaunce weapons, I believe that the Den Rock cock buffer was manufactured before 1655, and in all likelihood was not deposited at Den Rock earlier than 1620, as few Native Americans were armed with such weapons before this date. This supports the theory that the Contact Period component of Den Rock dates to middle of the seventeenth century (1625-1675), as such a weapon would not have been obsolete until after King Philip’s War when they were replaced by the next generation of ‘true’ flintlocks.

Den Rock as Temporary Natural Refuge

The presence of the snaphaunce cock buffer and gunflints raise the possibility that, in addition to ceramic production and hunting, there was another reason why Native Americans returned year after year to Den Rock. Although it is possible that these gun parts were used for hunting, they appear to be pistol parts from a combat firearm. Pistols, while deadly in close combat, were ineffectual for hunting. This evidence of martial firearms suggests that Den Rock may have been used as a natural hiding place or even fortification by Pennacook-Pawtucket people. This hypothesis becomes interesting when the distinctive physical characteristics of Den Rock are combined with historical documents and evidence from other similar sites in southern New England. This hypothesis would also explain why Native people continued to return to Den Rock during the Contact Period, even as the demand for traditional ceramics declined.

When Den Rock is approached from the Shawsheen River, the site is not visible until the visitor is directly upon it. This fact is lost on
modern visitors who approach from Route 114 and can see the cliff from a great distance. The area below the cliff slopes steeply down to the stream, then climbs steeply on the opposite side. People camped in this area would be well hidden from an approaching enemy. The surrounding wetlands, more extensive in the past before damming and filling changed the area's landscape, would have also limited the approaches to the site (Decima and Dudek 2000: 7). The top of Den Rock itself provides a panoramic view of the entire area. A lookout could easily spot an enemy approaching and warn the people below. In addition, a walk around the site demonstrates that the Den Rock is a natural redoubt with steep, rocky hillsides or sheer cliff faces defending every approach. The boulders on top of the rock also provide a natural palisades behind which defenders could hide. A few well-armed defenders could protect Den Rock from a great number of attackers. The area is also filled with crevices and cracks in the rock that could be used for shelter or to cache food, tools and weapons for emergencies.

Precedence for the Native American use of natural rock formations can be found throughout New England. One well-known example is Queen's Fort in Wickford, RI, where Narragansetts under Queen Quaiapen successfully hid from English forces during King Philip's War. Here the Indians constructed a secret refuge by using the natural boulders of a hilltop as part of their defenses and adding connecting walls of carefully laid stone to complete the fortification. This impressive spot is still easily recognizable (Malone 1991: 74). Native people at Den Rock would have needed to make only a few changes to create a similar defensive position.

Another example of a rock formation being used for a hidden camp is Anawan Rock in Rehoboth, MA. At this spot, Anawan, a Wampanoag chief and close friend Metacom (King Philip) was captured by Benjamin Church in the closing days of King Philip's War. According to a modern description, the area is protected on three sides by the Squannakonk Swamp with an imposing rock on its northern boundary. Any intruder would have to descend this rock face to surprise the camp (Schultz and Tougias 1999: 132). In his Diary of King Philip's War, Captain Benjamin Church offered his own account of Anawan's capture, along with a description of the rock formation in which the Chief and his followers took refuge. Both Church's and the contemporary description of Anawan Rock are similar to the landscape of Den Rock, down to the surrounding wetlands that defended the approaches and the caves and cracks in which goods could be cached (Gardner 1997). It is unlikely that Anawan chose such a location as his final campsite at random. Rather, he probably hoped to either elude his pursuers by concealing his camp beneath the rock or to use it as a natural redoubt to fight off an assault.

Since Den Rock is similar to Anawan Rock, it too may have served as a refuge. Its location on known Native thoroughfares as well as evidence for its use as a campsite over thousands of years indicate that it was a well-known spot. Additional support for Den Rock's use as a natural refuge can be found in a story from the American Revolution long after most Native Americans had left the Andover/Lawrence area. Describing an incident that occurred just over one hundred years before she wrote, Sarah Bailey recalled a panic that occurred in North Andover when it
was rumored British regulars were coming to plunder the town. Valuables were packed and people prepared to flee to the woods near Den Rock, where they thought to hide and find shelter (Bailey 1880: 313). Although the feared Red Coats never materialized, this story demonstrates that the Den Rock area was considered a good hiding place during times of trouble long after King Phillip’s War was over.

Conclusion

Den Rock has provided archaeologists with new information about Native Americans in northeastern Massachusetts during the Woodland and Contact Periods. The large assemblage of ceramics demonstrates different construction and decorating techniques, and combined with the presence of a temper quarry and workshop provides a broader picture of indigenous pottery production. The ceramics from Den Rock are an important source of information and one that is yet to be adequately studied.

The Contact Period evidence found during the excavation of Den Rock gives us a glimpse of what life may have been like for Native Americans during the turbulent days of the mid-seventeenth century. The presence of reworked ballast flint, sheet copper and bottle glass fragments indicate that Den Rock is indeed a Contact Period site and likely to date between 1625 and 1675. The recovery of a snaphaunce cock buffer supports this conclusion since Native people did not possess such weapons prior to 1625 and snaphaunce firearms were replaced by flintlocks after 1675. The ballast flint artifacts from Den Rock also provide evidence of how Native Americans adapted European materials in order to make traditional tools. Native people also learned quickly to make their own versions of European gunflints. These native-made gunflints illustrate that indigenous people were remarkably resourceful and able to incorporate many aspects of European technology into their own culture.

Perhaps the most interesting and important contribution of the Den Rock site is its potential use as a natural refuge. The presence of military artifacts, documentary evidence of other similar sites and the distinct topography of the rock itself all support this conclusion. As such, Den Rock helps us to understand an important Native American strategy for resisting English occupation in the seventeenth century, and adds to our sense of the topographical features native people sought out for their sites. Finally, I believe that many similar Contact Period sites in New England may have functioned as natural refuges and that as archaeologists excavate sites near large rock formations, we can continue to add to our understanding of this intriguing era of adaptation and resistance.

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